



November 1, 2016

Joseph Laydon
Town Planner
Grafton Municipal Center
30 Providence Road
Grafton, MA 01519

RECEIVED

NOV - 1 2016

**PLANNING BOARD
GRAFTON, MA**

**Subject: Estates at Bull Meadow, Appaloosa Drive
Definitive Plan Review**

Dear Joe:

We received the following documents in our office October 11, 2016:

- Correspondence from McCarty Engineering, Inc. to Town of Grafton Conservation Commission dated October 11, 2016, re: Definitive Subdivision Revised Submission, Estates at Bull Meadow.
- Correspondence from McCarty Engineering, Inc. to the Grafton Conservation Agent dated October 11, 2016, re: Estates at Bull Meadow, Response to Peer Review Comments.
- Correspondence from EcoTec, Inc. to Town of Grafton Conservation Commission dated October 10, 2016, re: 109 Adams Road, Grafton.
- Correspondence from Green International Affiliates, Inc. to McCarty Companies dated September 22, 2016, re: Estate at Bull Meadow, Appaloosa Drive, Graves Engineering Vertical Curve Comment.
- WPA Form 3 – Notice of Intent, Massachusetts Department of Environmental Protection dated October 11, 2016.
- Plans entitled Definitive Conventional Subdivision Plans; Estates at Bull Meadow; North Grafton, Massachusetts dated June 10, 2016 and revised October 11, 2016, prepared by McCarty Engineering, Inc. (29 sheets)
- Bound Document entitled Drainage Report: Estates at Bull Meadow Definitive Subdivision, North Grafton, Massachusetts dated October 11, 2016, prepared by McCarty Engineering, Inc.

We also received the following document via email October 18, 2016:

- Correspondence from McCarty Engineering, Inc. to the Grafton Town Planner dated October 11, 2016, re: Estates at Bull Meadow, Response to Peer Review Comments.

This letter is a follow-up to our previous review letter dated July 19, 2016. For clarity, comments from our previous letter are *italicized* and our comments to the Applicant's responses are depicted in **bold**. Previous comment numbering has been maintained.

Our comments follow:

Subdivision Rules & Regulations (SR&R)

1. *Although the boundary of the development was drawn on the plans, it is difficult to distinguish the boundary from other interior and exterior lot lines. The boundary should be a heavier line type. (§3.3.3.1)*
Acknowledged. The boundary of the development has been revised to a distinguishable line type.
2. *A north point needs to be shown on Sheet 6 and for the three viewports on Sheet 18. (§3.3.3.6)*
North arrows have been added to the three viewports on Sheet 18, however, one is still needed on Sheet 6.
3. *Notice of any and all decisions, special permits (e.g.: Major Residential Special Permit), etc. must be identified on the plans, including Worcester District Registry of Deeds book and page numbers. (§3.3.3.13)*
Acknowledged. Notice of decisions, special permits, etc. with Worcester District Registry of Deeds book and page numbers have been added to the plans.
4. *The species of proposed street trees were not identified in the plans. (§3.3.3.20)*
Acknowledged. A plant schedule was added to Sheet 8 and Sheet 9.
5. *The profile for Paddock Ridge Drive shows fill greater than 6 feet between stations 12+75 and 14+60. We understand a waiver request was submitted and will be reviewed by the Planning Board. (§4.1.2.1.b)*
No further comment necessary.
6. *The minimum K requirement for vertical curves was not met at station 12+24 (proposed sag curve with K=27) and at station 13+81 (proposed crest curve with K=6). (§4.1.5.3)*
The minimum K requirement for a crest vertical curve is 28, however, a crest curve with K=7 is proposed at station 13+81. The Engineer responded that the curve meets the AASHTO requirement regarding sight distance for a design speed of 20 MPH. Nevertheless, the grades of the approach tangents are shallow and the height of the crest curve is low, such that a driver located in the low point of the road on one side of the vertical curve will be able to see an object in the road at the low point on the opposite side of the vertical curve. In short, based upon the information submitted with the revised plans and upon further evaluation of sight lines, we do not take issue with the sight distance provided at the crest curve and we find the K value of 7 to not be unreasonable in this particular situation.

As for the sag vertical curve at station 12+24, the plans were revised to propose a K of 28. The issue at hand is the ability to observe objects in the road if illuminated by a vehicle's headlights. In our opinion, the plans should be revised to provide a minimum K of 35 as required. Such a revision will require the length of the vertical curve to be extended from 164 feet to 208 feet and will result in the low point of the vertical curve being moved approximately sixteen feet and raised approximately 0.9 feet, thereby not impacting the efforts already made to address stormwater management.

7. *Street lights were not shown on the plans. (§4.7.6)*
Acknowledged. Street lights have been added to the plans. We understand that the applicant will have to coordinate the final street light locations with the Grafton Board of Selectmen.
8. *The three hydrants proposed along Paddock Ridge Drive between Carriage House Lane and Bridle Ridge Drive are proposed at spacing greater than the required maximum of 500 running feet. If not already done, the Planning Board may wish to solicit comments from the Fire Department and Grafton Water District relative to hydrant locations. (§4.7.7.1)*
The Engineer responded that they will solicit a response from the Grafton Fire Department and Water District.
9. *Granite curb inlets are required for the catch basins. (§4.7.8.3)*
Acknowledged. The precast concrete catch basin detail has been revised to specify granite curb inlets.
10. *Sheet 22 proposes a reinforced concrete bound; however, granite bounds are required. The bound material and dimensions need to be revised. Additionally, on Sheet 5 two bounds are missing at the eastern drain easement. (§4.8.1)*
Acknowledged. The detail has been revised to a granite bound and bounds have been added at the drain easement.
11. *Concrete sidewalk needs to be shown across driveways. (§4.9.1)*
The Engineer responded that a waiver has been requested not to install concrete sidewalks across proposed driveways. GEI has not received any additional waivers as a part of this submittal; we understand waiver requests will be submitted directly to the Planning Board for review.
12. *The proposed 10-foot wide trail access easement shown between Lots 11 and 12 does not meet the minimum required width of 20 feet. Also, the easement was labeled as a drain easement on Sheet 5. (§4.11.4)*
Acknowledged. The trail access easement has been relocated from between Lots 11 and 12 to between Lots 7 and 8. The proposed trail easement is 20 feet wide. GEI is unaware of existing or proposed trails on the adjacent property.
13. *A waiver was requested to allow less than the required four feet of cover over the drain line at two locations. The proposed cover is at least 2.5 feet. We don't have an issue with the waiver request as long as Class V reinforced concrete pipe is used along Carriage House Lane between DMH 6 and Infiltration Basin 1. The other location is a cross-country drain line; Class III pipe (which is commonly used) would not be unreasonable at this location. (§5.4.2.2)*
Acknowledged. The revised plans specify Class V reinforced concrete pipe along Carriage House Lane between DMH 6 and Infiltration Basin 1.
14. *Retaining walls are proposed within the Paddock Ridge Drive right-of-way between stations 12+50± and 14+45± and a waiver was requested. We understand that the Town of Grafton requires retaining walls to be outside the rights-of-way. (Schedule E, Standard Cross Section Minor Street B)*
No further comment.

15. The "Bituminous Concrete Pavement Detail" on Sheet 22 needs to be revised to be consistent with the "Minor Street B Standard Cross-Section" construction detail on Sheet 23 and with Grafton Subdivision Rules and Regulations. The total pavement thickness is incorrect and the gravel base needs to consist of one 12" lift of gravel.

Acknowledged. The "Bituminous Concrete Pavement Detail" has been revised to specify a total pavement thickness of 4.25 inches and a gravel base of 12 inches.

Zoning By-Law

16. Lot 6 has a frontage of 139.98 feet which does not meet the minimum 140-foot requirement. (§3.2.3.2)

Acknowledged. The plans have been revised to provide a 140-foot frontage for Lot 6.

Stormwater Management & Hydrology Review

17. Access to Infiltration Basins 1 and 2 needs to be revised. The minimum top-of-berm berm width needs to be ten feet and the access grade can't exceed 20%. The tops of the berms are proposed to be approximately seven feet wide and the grade at Infiltration Basin 2 is approximately 33% (3H:1V).

Acknowledged. The infiltration basins were revised to provide a minimum top-of-berm width of ten feet and a maximum access grade of 20%.

18. Calculations must be provided to demonstrate the infiltration forebay size in Infiltration Basins 1 and 2 comply with DEP Stormwater Management Guidelines.

Acknowledged. Calculations have been provided for forebay sizing.

19. The two infiltration basins will only have approximately 0.8 feet of freeboard as measured between the 100-year peak water surface elevation and the top of the berms; at least one foot of freeboard needs to be provided.

Acknowledged. The infiltration basins have been revised to provide a minimum one foot of freeboard.

20. The plans should clearly show that the sides of the riprap spillways and down-gradient aprons are to also be lined with riprap in order to avoid erosion along the spillways' edges.

The plans show the width of the riprap spillways extending to the top-of-berm of the infiltration basins, however, there appears to be an issue with the revised grading of the basins at the spillways (see comment 21).

21. The riprap spillway elevations need to be labeled at Infiltration Basins 1 and 2.

Riprap spillway elevations have been labeled at the infiltration basins, however, revised grading is inconsistent with the riprap spillway elevation labels. For example, the spillway elevation for Infiltration Basin 1 is labeled as 437.0, while the proposed grading suggests the spillway elevation to be higher than elevation 438.0.

22. Soil testing has not yet been performed at Infiltration Basin 2 to demonstrate compliance with MassDEP's required two-foot offset to seasonal high groundwater. Based upon the soil testing data that was submitted (for fifteen building lots and Infiltration Basin 1), the

proposed elevation for Infiltration Basin 2 does not appear to be unreasonable. Nevertheless, soil testing will have to be performed at infiltration Basin 2.

The Engineer responded that soil testing will be conducted after Conservation Commission approval. Soil testing will also need to be performed at Infiltration Basins 3 and 4. Considering the extent of soil testing done to date, GEI does not take exception to this approach.

23. *The Area 2A label on the Existing Conditions Watershed Plan should be removed. This label applies to the proposed conditions.*

Acknowledged. The Area 2A label has been removed from the Existing Conditions Watershed Plan.

24. *There is an unlabeled area shown on the Proposed Conditions Watershed Plan in front of Subcatchment Lot 13.*

The area remains unlabeled.

25. *It is necessary to provide appropriately-sized riprap aprons at drainage system discharge points. Additionally, supporting calculations relative to the apron dimensions and riprap stone size must be submitted.*

Calculations have been provided for sizing the riprap aprons, however, the calculations are not consistent with the plans. The calculations require a riprap apron length of twelve feet for FES 1 and sixteen feet for FES 4 and 5, however, based on the "Flared End w/ Riprap Detail" on Sheet 23 the lengths of these aprons would be ten feet.

26. *Sheet 10 refers to an infiltration basin while Sheet 12 refers to the same structure as a detention basin. The labels on the plans should be consistent and should follow MassDEP nomenclature.*

The label for the basin has been removed from Sheet 12, however, while Sheet 10 refers to an infiltration basin, Sheet 7 refers to the structure as a stormwater management system, and Sheet 8 refers to the structure as a stormwater mitigation area. The labels on the plans should be consistent and should follow MassDEP nomenclature.

General Engineering Comments

27. *On Sheet 21, the floor fill in the precast drain manhole construction detail needs to have a channel as opposed to being a planar surface.*

The precast drain manhole construction detail has not been revised (now on Sheet 23).

28. *Guardrails and pedestrian barriers (e.g. chain link fences) need to be provided at the tops of the retaining walls.*

A four-foot chain link fence has been added to the Precast Concrete Retaining Wall Detail, however, no guardrail is proposed between the roadway and the retaining wall. We believe a cross section of the right-of-way at the wetland crossing should be provided to show the proposed roadway, retaining walls, chain link fences, guardrails, sidewalk, and utilities.

General Comments

29. *We understand that the Planning Board or its staff will review any impact reports.*
No further comment necessary.
30. *We understand that the Grafton Water District will review the proposed water utility infrastructure.*
No further comment necessary.
31. *We are not aware if a meeting has occurred with Town staff/departments to address the configuration of the existing Appaloosa Drive cul-de-sac. At issue is whether the cul-de-sac should remain as is, be configured with an island or reconfigured as a through road. (MRSP 2014-8, Condition C3)*
No further comment.
32. *The cover sheet specifies the site as being in zoning district R4. This should be corrected to R40.*
Acknowledged. The cover sheet has been revised to specify the site as being in zoning district R40.
33. *It is recommended for clarity that the existing conditions plans (Sheets 1 and 2) be revised so the underlying gray existing conditions lines are black.*
Acknowledged. The existing conditions plans have been revised so that the existing conditions lines are black.
34. *The layout plan identifies roads by road name while the profile plans identify roads with a letter. Road identification should be consistent.*
Acknowledged. The profile plans have been revised to identify the road names.
35. *Prior to plan endorsement, all sheets of the plan set, including the cover sheet, must include the statement "See Sheet ____ for Planning Board Conditions of Approval", and the conditions must be inscribed on said sheet.*
Acknowledged. The statement has been added to all sheets, and a Conditions of Approval sheet has been added to the plan set.
36. *The design engineer should be aware that the town has local wetland regulations and stormwater regulations that are administered by the Conservation Commission. GEI has not reviewed the submittal for compliance with those regulations.*
Acknowledged. GEI has been authorized to review the submittal for compliance with those regulations and is issuing a letter under separate cover.

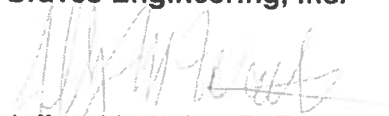
Additional Comments: November 1, 2016

37. **The Proposed Conditions Watershed Plan was not revised to address the changes to the drainage and stormwater management system, grading or the hydrology computations.**
38. **GEI noted that Infiltration Basin 2 was converted to a subsurface infiltration system. Sheet 27 includes details for the system, however, no elevations were provided. Elevations for the cross section of the system must be provided, as well as a detail for the upstream manhole with weir.**

39. Sheet 25 includes an SC-740 Dry Well detail for the recharge of roof runoff at individual lots. The dry wells should be clearly labeled as dry wells on the plans in order to differentiate the dry wells from the subsurface infiltration system.
40. On Sheets 14 and 15, the elevations at the bottom of the profiles need to be revised to include the proposed elevations. Two sets of existing elevations were provided on these profiles.
41. On Sheet 11, the drainage pipe located on Lot 8 between DMH 8 and DMH 9 is located outside of the drainage easement. The pipe location or easement will need to be revised.
42. On Sheet 11, the proprietary stormwater treatment device (STC 450 at DMH 8) should be located within or adjacent to the right-of-way for ease of maintenance (e.g. cleaning with a vacuum-truck) if the Town of Grafton becomes responsible for its maintenance.
43. On Sheet 22, in the table Sequence of Work, installation of the stabilized construction entrance(s) to be used for land clearing needs to occur before the start of tree cutting and chipping.

We trust this letter addresses your review requirements. Feel free to contact this office if you have any questions or comments.

Very truly yours,
Graves Engineering, Inc.



Jeffrey M. Walsh, P. E.
Vice President

Cc: Brian Marchetti, P.E., McCarty Engineering, Inc.